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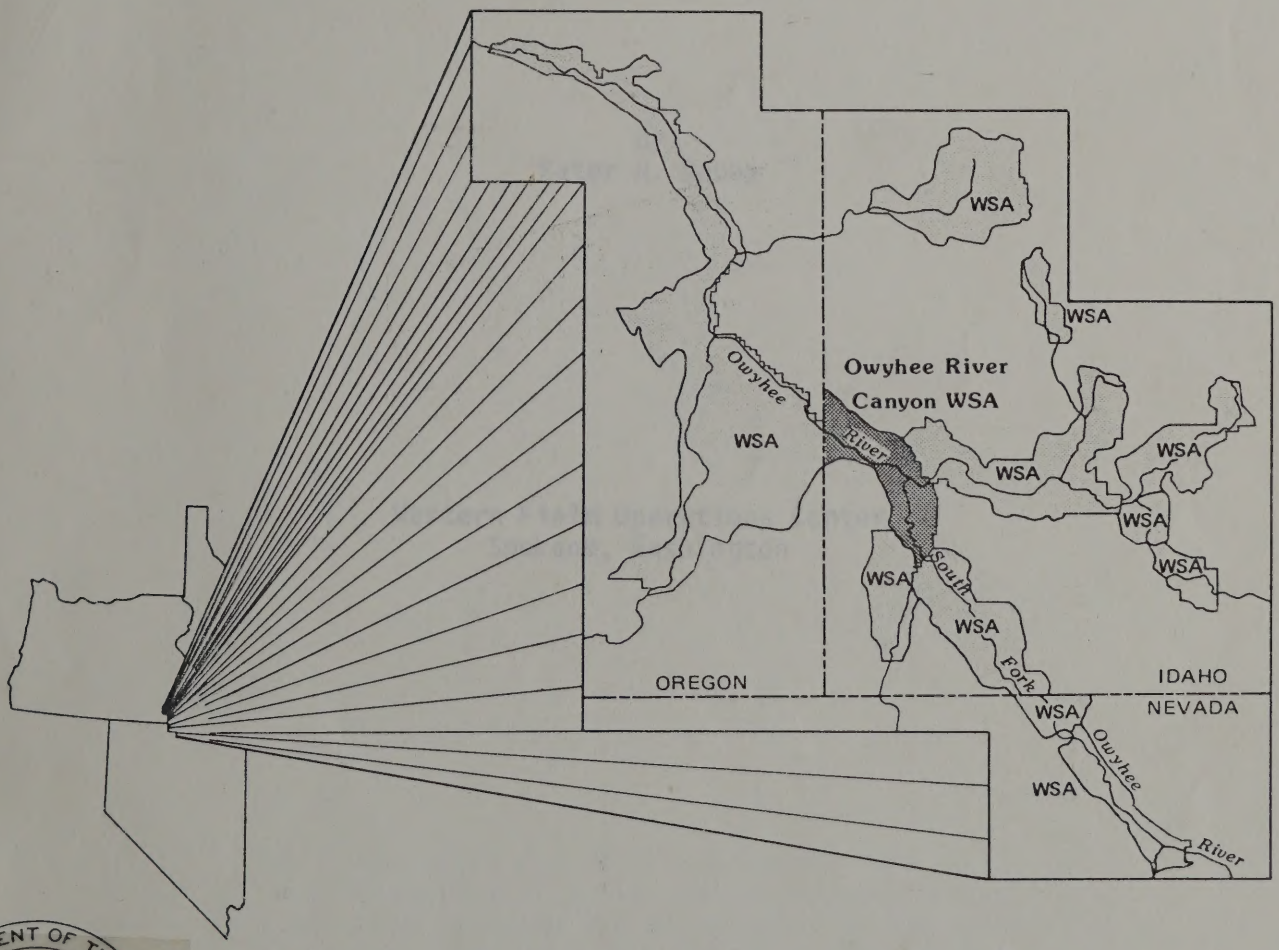

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MINERAL RESOURCES OF THE OWYHEE RIVER CANYON WILDERNESS STUDY AREA, OWYHEE COUNTY, IDAHO

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PREFACE

The Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976) requires the U.S. Geological Survey and U.S. Bureau of Mines to conduct mineral surveys on U.S. Bureau of Land Management administered land designated as Wilderness Study Areas ". . . to determine the mineral values, if any, that may be present . . . ." Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a Bureau of Mines mineral survey of the Owyhee River Canyon Wilderness Study Area (ID-16-48B), Owyhee County, Idaho.

This open-file report will be summarized in a joint report published by the U.S. Geological Survey. The data were gathered and interpreted by Bureau of Mines personnel from Western Field Operations Center, East 360 Third Avenue, Spokane, WA 99202. The report has been edited by members of the Branch of Mineral Land Assessment at the field center and reviewed at the Division of Mineral Land Assessment, Washington, DC.

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SUMMARY

A mineral survey of the Owyhee River Canyon Wilderness Study Area (WSA), covering 33,700 acres of Bureau of Land Management administered land in southwestern Idaho, was conducted by the U.S. Bureau of Mines in 1984. Cenozoic volcanic rocks - mainly tuffs, rhyolite, and basalt - and interbedded sediments are exposed in the WSA.

The Lu-Lew Prospect, just south of the WSA, and the White Point Prospect, partially within the WSA, were located for lapidary jasper and mineral specimens. A small amount of material has been produced from each property. Oil and gas leases and lease applications are along the southeast edge of the area; there has been no known exploration. Diatomaceous earth is present but not in sufficient quantity or quality to be economically exploited.

Sand and gravel occurrences along these portions of the Owyhee and South Fork Owyhee Rivers are small and scattered; they could supply only local construction needs for sand and gravel. Two samples from these occurrences contained detectable gold at less than $\$0.02/yd^3$, and no significant amounts of other heavy minerals.

INTRODUCTION

Mineral surveys of designated Wilderness Study Areas (WSAs) 1/ are conducted by the U.S. Bureau of Mines (USBM) and the U.S. Geological Survey (USGS) at the request of the U.S. Bureau of Land Management (BLM). The USBM researches the mining and mineral exploration history and evaluates mines, prospects, and mineralized areas within or adjacent to WSAs. The USGS studies the WSAs by regional geochemical and geophysical surveys and geological mapping. The USBM and the USGS results are summarized in a joint report used to determine the suitability of WSAs for inclusion into the National Wilderness Preservation System. Although the immediate goal of this report and other USBM reports is to provide data for the President, Congress, the BLM, and the general public for land-use decisions, the long-term objective of the USBM studies is to help insure that the Nation has an adequate and dependable supply of minerals at reasonable cost.

1/ A WSA is a roadless area or island that has been inventoried by the U.S. Bureau of Land Management and found to have wilderness characteristics as described in section 603 of the Federal Land Policy and Management Act and section 2(c) of the Wilderness Act of 1964, (78 Stat. 891).

Setting

The Owyhee River Canyon Wilderness Study Area (WSA)(ID-16-48B) encompasses approximately 33,700 acres of deep canyons and relatively flat-lying, high plateau in southwest Idaho (fig. 1). Along the Owyhee and South Fork Owyhee River canyons, local relief is commonly between 800 and 1,000 ft in less than 1/4 mile. Within the WSA, the high plateau ranges in elevation from 5,100 to 5,400 ft, with the north end gently sloping up to a maximum of 5,420 ft near Bald Mountain (fig. 2). The lowest elevation in the study area is about 4,200 ft on the Idaho-Oregon border at river level.

The local climate is semi-arid, with average annual precipitation in the range of 11.8 in. (Danner, OR) to 14.7 in. (Owyhee, NV) (U.S. Department of Commerce, 1973). Dominant vegetation is grasses, sagebrush, and scattered juniper trees.

Access to the study area is by dirt roads which are rough in places during dry weather and nearly impassable during wet weather. The 45 Ranch on the southern end of the WSA is a 45-mile drive from Owyhee, NV, and the northern WSA boundary is a 70-mile drive from Jordan Valley, OR.

The Owyhee River Canyon WSA adjoins the Owyhee Canyon WSA (OR-003-195) (Linne, 1985) and is separated by jeep roads from the Deep Creek-Owyhee River WSA (ID-16-49A) (Capstick and Buehler, 1985), the South Fork Owyhee River WSA (ID-16-53)(Mayerle, 1985), and the Little Owyhee River WSA (ID-16-48C)(Buehler and Capstick, 1985) (fig. 2).

Previous Studies

Rock descriptions and stratigraphy have been reported on by Ekren and others (1981) in a geologic map of the western part of Owyhee County, and by Bonnichsen and Breckenridge (1982). A detailed description of the local rhyolites and their stratigraphy has been published (Ekren and others, 1984). Studies regarding geologic setting of regions peripheral to the WSA include those by Decker (1962) - Bull Run quadrangle, Asher (1968) - Silver City region, Coats (1971) - Owyhee quadrangle, Taubeneck (1971) - south extension of the Idaho batholith, Kittleman (1973) - Owyhee region of Oregon, Bennett (1976) - Juniper Mountain-South Mountain region, and Warner (1980) - southern Idaho, northern Nevada, and southeastern Oregon petroleum exploration. A report on the geology, energy, and minerals (GEM) resources of the WSA was prepared by Mathews and Blackburn in 1983. A 1976 USBM report of the Owyhee River's mineral resources was prepared by Richard Morris as an unpublished Wild and Scenic River report.

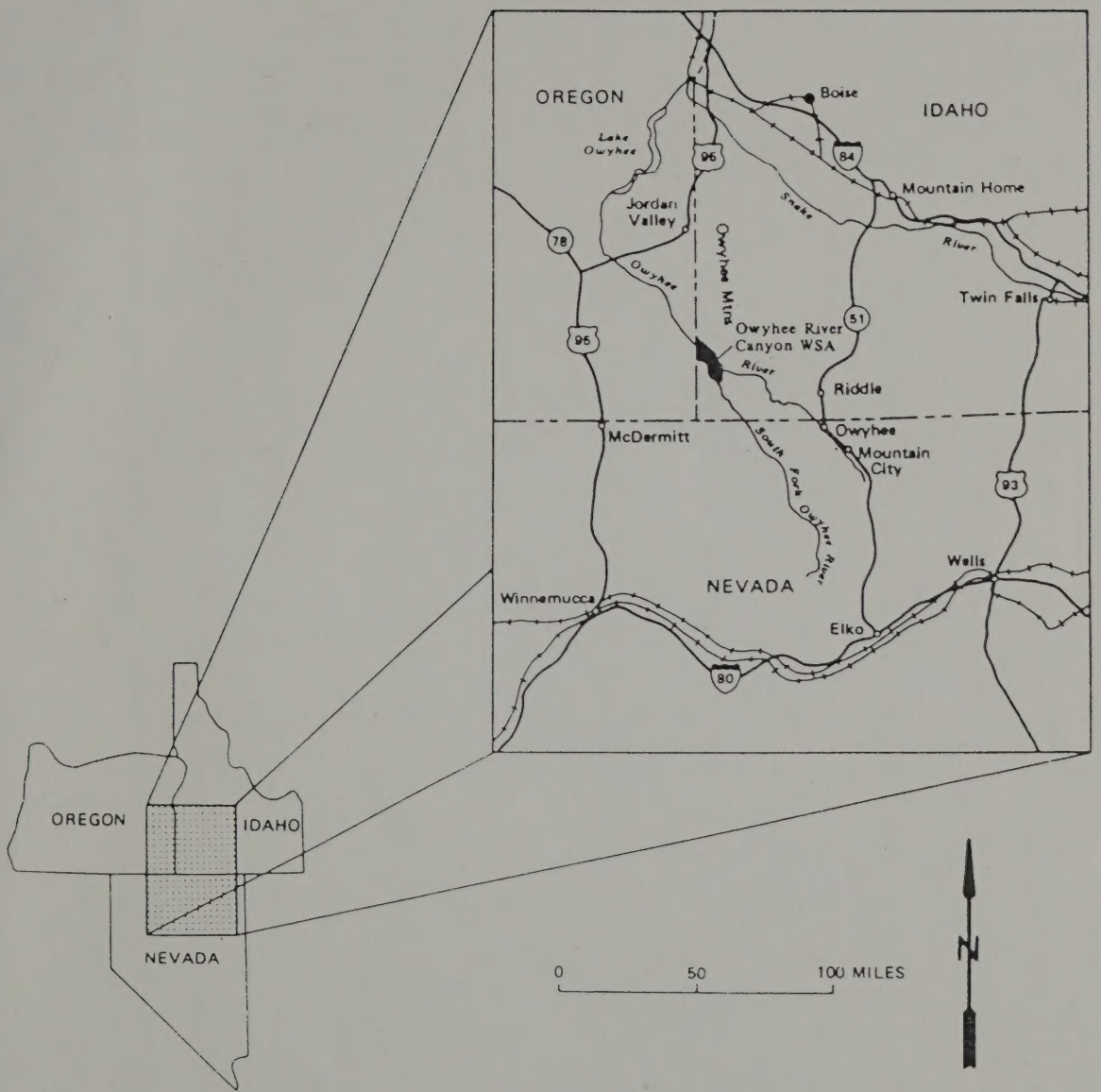


FIGURE 1. – Location of the Owyhee River Canyon Wilderness Study Area (ID-16-48B), ID

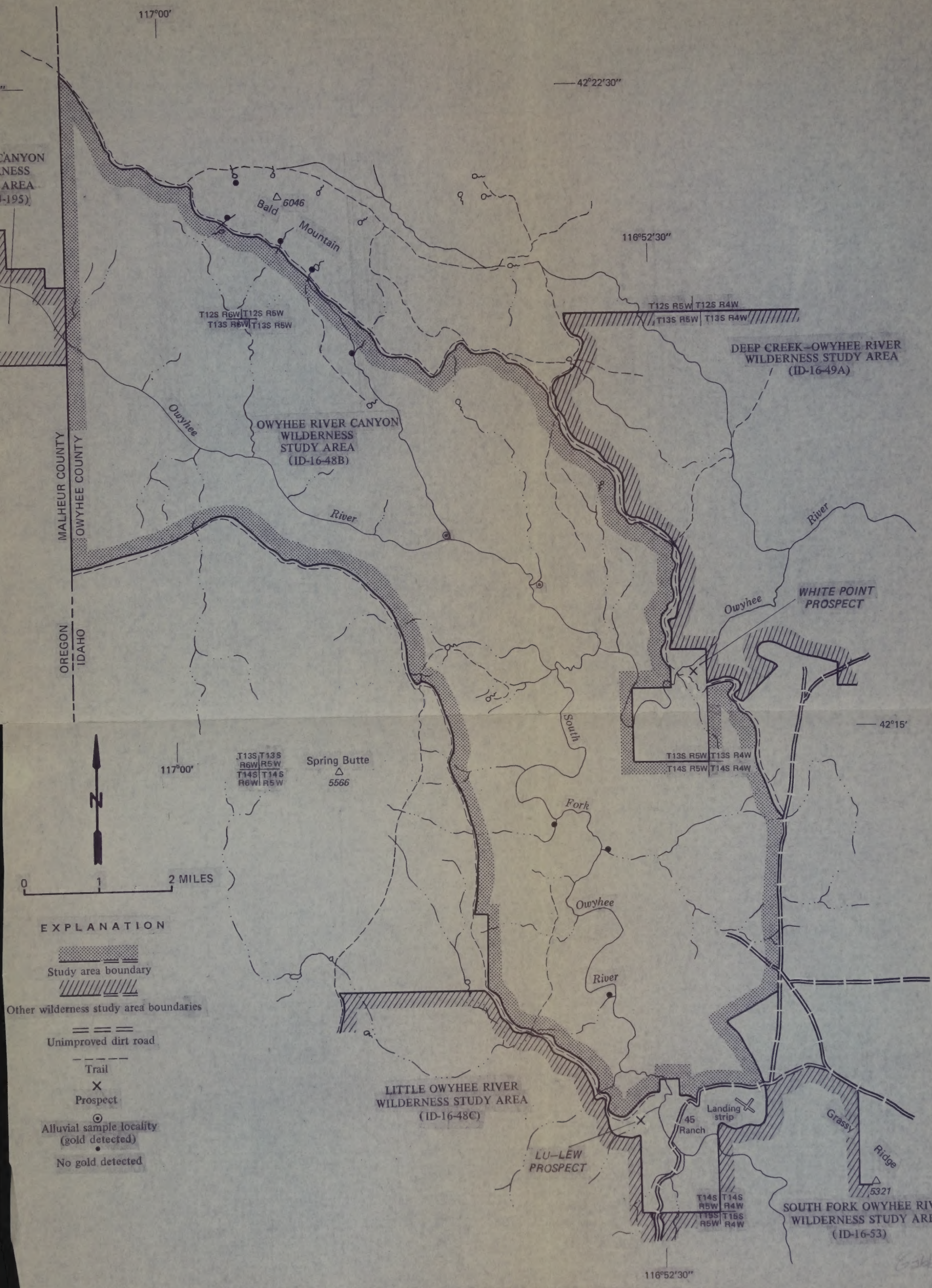
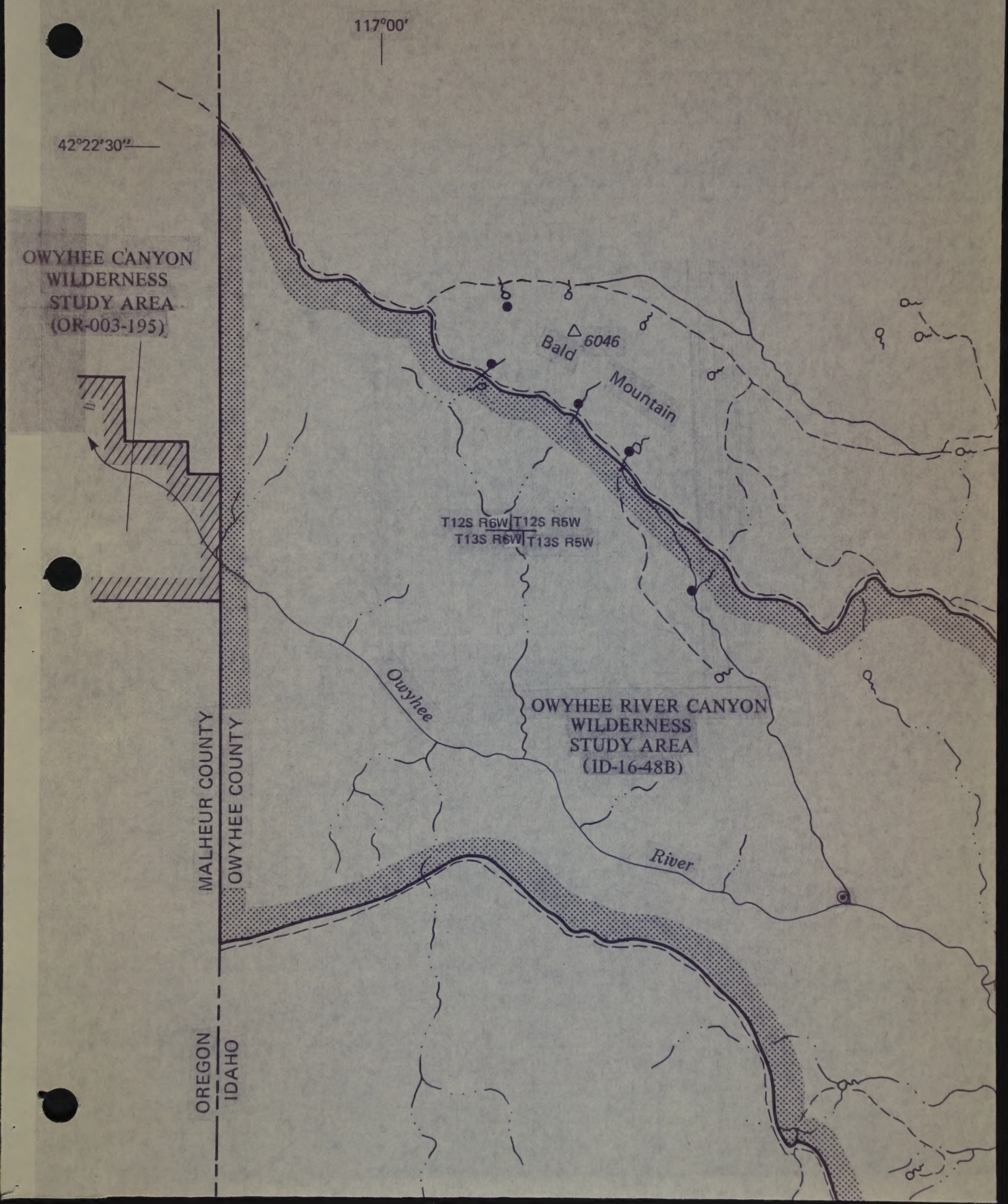
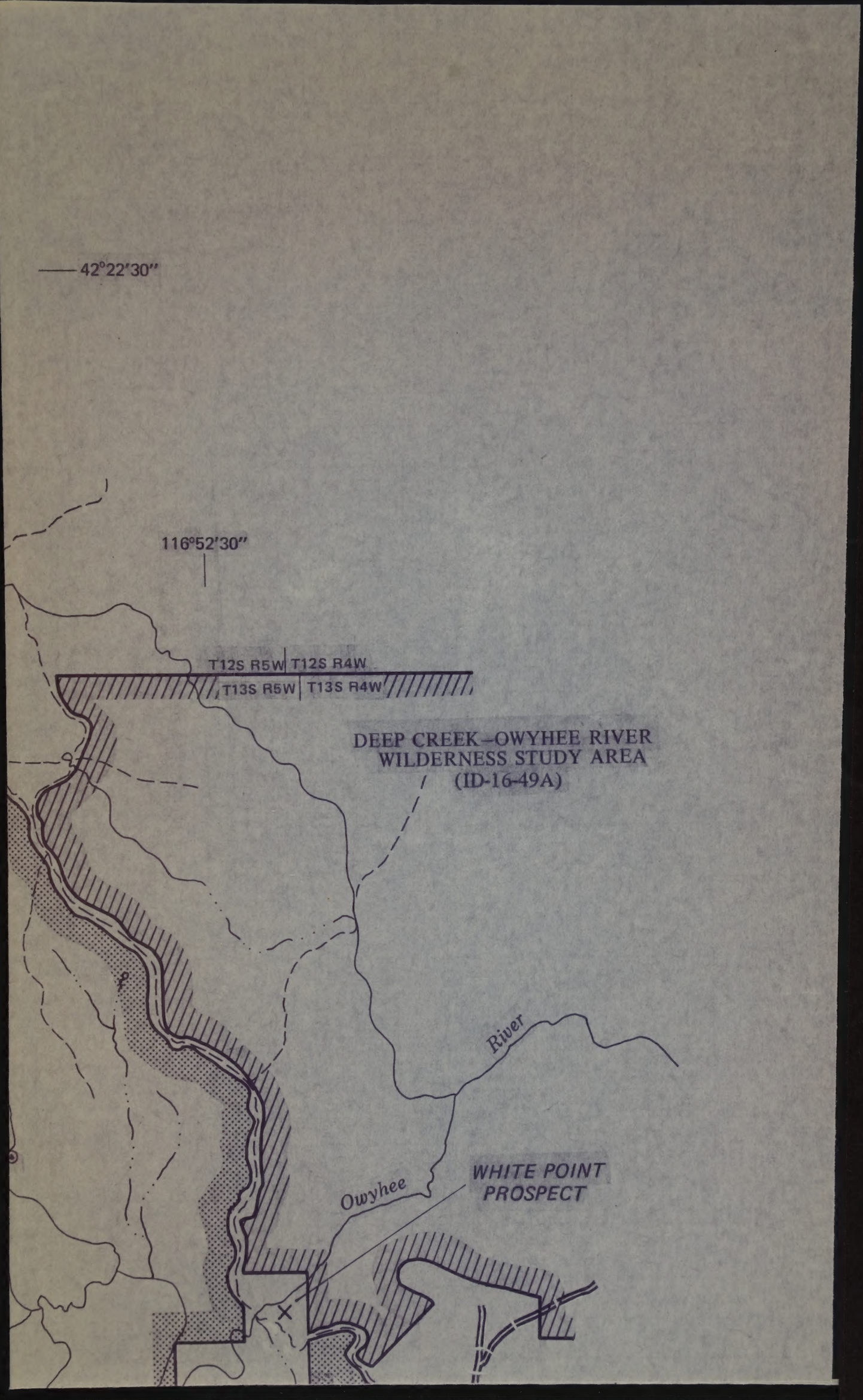


FIGURE 2. – Prospects and placer sample localities in and adjacent to the Owyhee River Canyon Wilderness Study Area, ID


117°00'
42°22'30"
OWYHEE CANYON
WILDERNESS
STUDY AREA
(OR-003-195)
△6046
Bald
Mountain
T12S R6W
T12S R5W
T13S R6W
T13S R5W
Owyhee
River
OWYHEE RIVER CANYON
WILDERNESS
STUDY AREA
(ID-16-48B)
MALHEUR COUNTY
OWYHEE COUNTY
OREGON
IDAHO


42°22'30"
116°52'30"
T12S R5W
T12S R4W
T13S R5W
T13S R4W
DEEP CREEK–OWYHEE RIVER
WILDERNESS STUDY AREA
(ID-16-49A)
River
Owyhee
WHITE POINT
PROSPECT

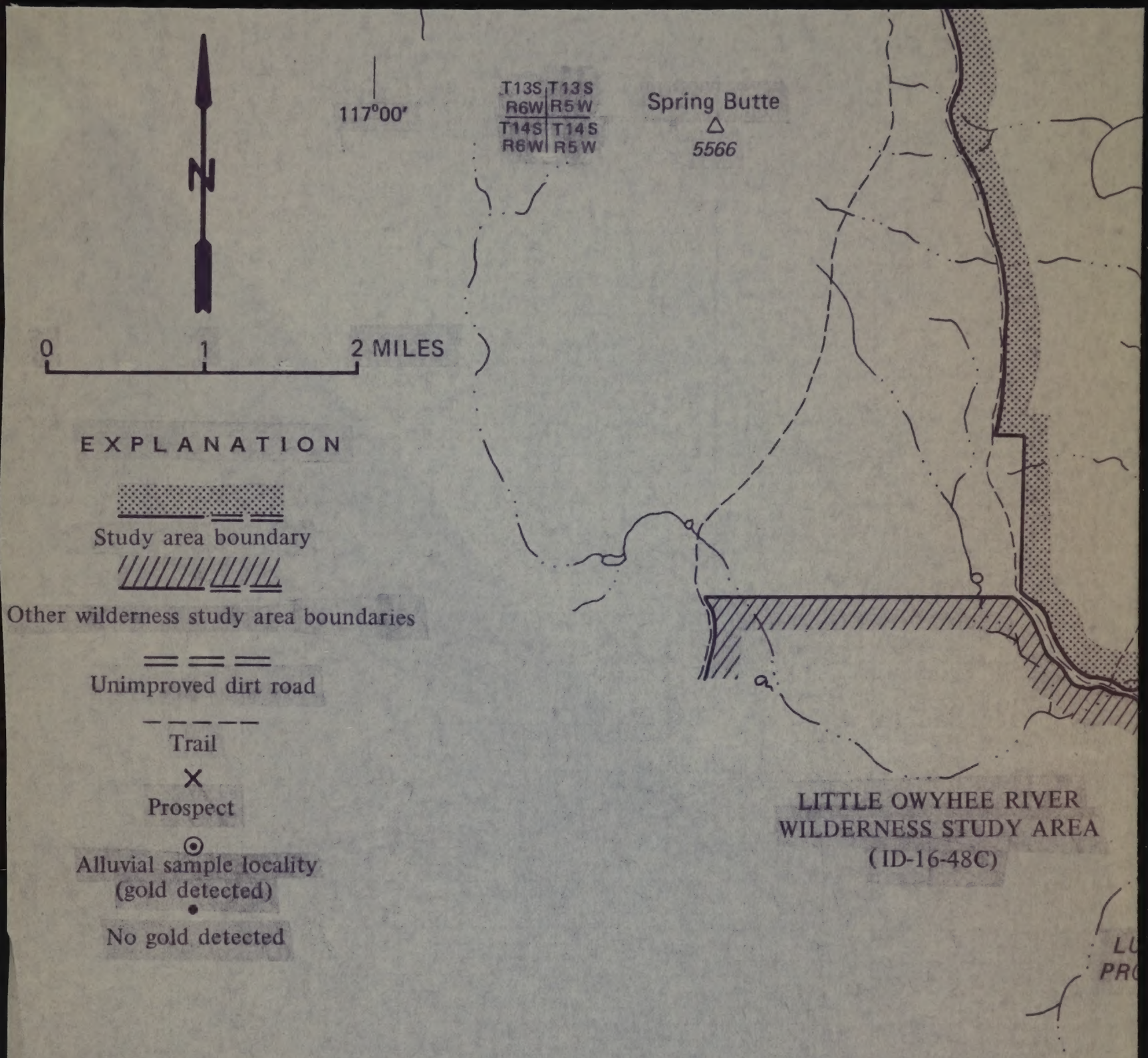
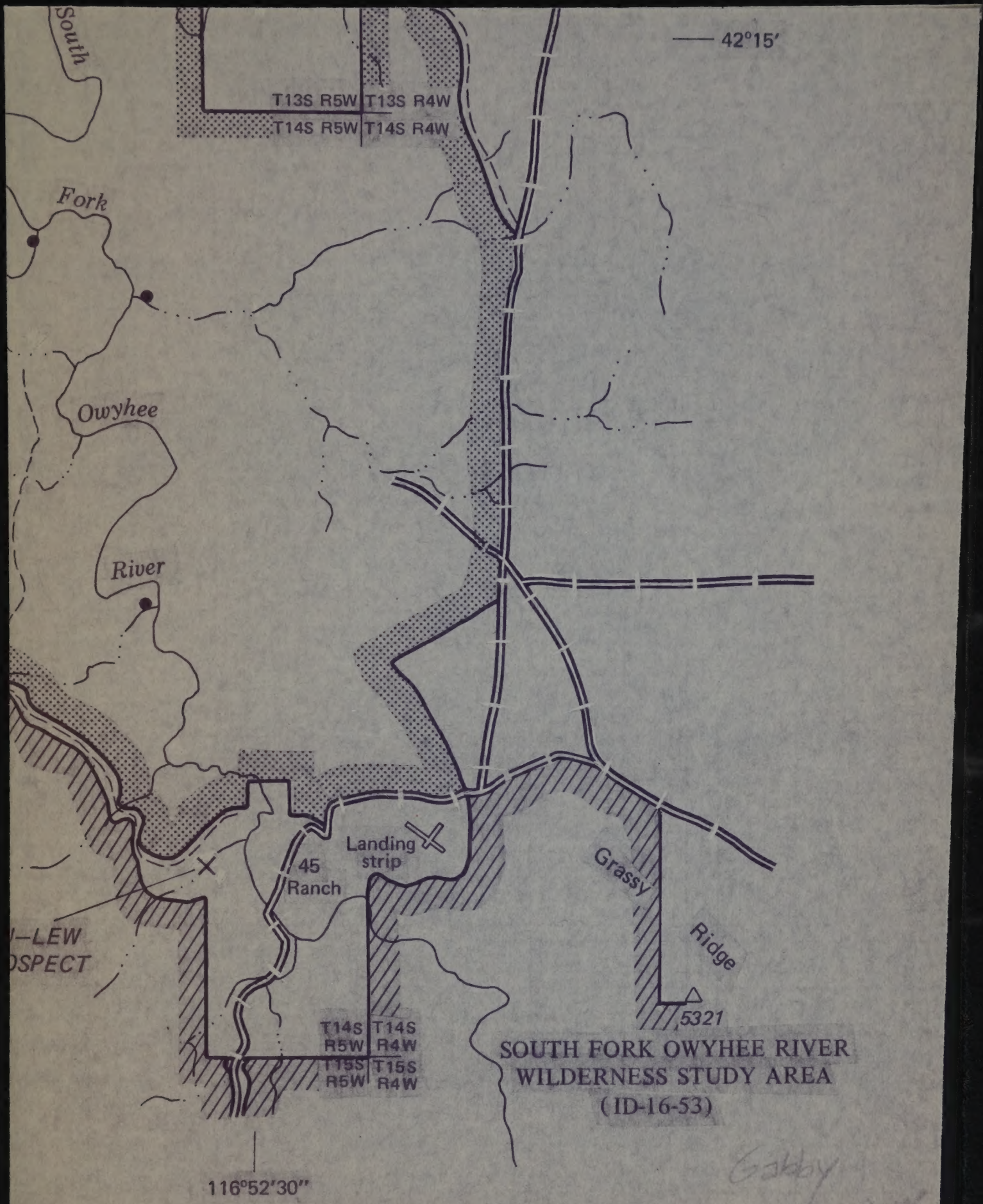


FIGURE 2. – Prospects and placer sample localities in and adjacent to the Owyhee R



SOUTH FORK OWYHEE RIVER
WILDERNESS STUDY AREA
(ID-16-53)

iver Canyon Wilderness Study Area, ID

Present Study

Work by the USBM entailed pre-field, field, and report preparation phases that were done in 1984. Pre-field studies included library research and perusal of Owyhee County and BLM mining and mineral lease records. Bureau of Mines, State, and other production records were searched and pertinent data compiled. Claim owners and lessees were contacted, when possible, for permission to examine properties and publish the results. Field studies involved searches for all prospects and claims indicated by pre-field studies to be within or near the WSA. Those found were examined, and where warranted, were mapped and sampled. Prospects and claims outside, but near the WSA were studied to determine whether mineralized zones might extend into the WSA, and to establish guides to mineral deposits in the region. In addition, ground and air reconnaissance was done in areas of obvious rock alteration to check for mining-related activities that may not have been recorded.

Samples collected at prospects and mineralized sites included 21 rock, 11 placer, and 7 petrographic samples. Rock samples were of four types: 1) chip - a regular series of rock chips taken in a continuous line across a mineralized zone or other exposure; 2) random chip - an unsystematic series of chips taken from an exposure of apparently homogeneous rock; 3) grab - rock pieces taken unsystematically from a dump, stockpile, or of float (loose rock lying on the ground); and 4) select - pieces of rock chosen, generally, from the apparently best mineralized parts of a pile or exposure, or of any particular fraction (e.g., quartz, host rock). Placer samples were reconnaissance - samples of surficial sand and gravel, generally one or two level 14-in. pansful concentrated on site to check for presence of gold or other heavy minerals in placers.

Most rock samples were fire-assayed for gold and silver. At least one sample from each locality was analyzed for 40 2/ elements by semi-quantitative methods to detect unsuspected elements of possible significance. Petrographic examinations were performed to identify selected rock types, alteration suites, and mineral assemblages. Placer samples, partially concentrated in the field, were further concentrated on a laboratory-size Wilfley table. Resulting heavy mineral fractions were scanned with a binocular microscope to determine heavy mineral content. Concentrates were also checked for radioactivity and fluorescence. Complete analyses are on file at the Western Field Operations Center (WFOC), Spokane, WA.

2/ Aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, columbium, copper, gallium, gold, iron, lanthanum, lead, lithium, magnesium, manganese, molybdenum, nickel, palladium, phosphorus, platinum, potassium, scandium, silicon, silver, sodium, strontium, tantalum, tellurium, tin, titanium, vanadium, yttrium, zinc, and zirconium.

ACKNOWLEDGEMENTS

The author wishes to thank John Benedict (BLM district office, Boise, Idaho) for excellent guidance on a float trip through the WSA, Sonny and Judy Smith for their warm and generous hospitality at the 45 Ranch, and Ron Mayerle (WFOC geologist) for his excellent assistance during field examinations.

GEOLOGIC SETTING

The Owyhee River Canyon WSA is within the Owyhee Upland geomorphic subprovince, which is part of the Columbia Intermontane province (Thornbury, 1965). According to Thornbury, features that distinguish the Owyhee Upland from the High Lava Plain subprovince to the north are the older lavas, dominantly rhyolite and quartz dacite lavas. Also, the upland is structurally upwarped, with more-advanced erosion. Because doming rather than faulting is the dominant structural feature, with the subsequent lack of typical topography, the Owyhee Upland is not considered part of the Basin and Range province.

In the vicinity of the WSA, it is estimated that a minimum of 3,000 ft of Cenozoic rocks covers the pre-Cenozoic basement complex (Derby, 1981, p. A-3) 3/(Ekren and others, 1981; Asher, 1968; and Bennett, 1976). Within the study area relatively flat-lying, mid- to late-Miocene rhyolite, basalt, and interbedded sediments crop out. From oldest to youngest, the major units found are: a) tuff of Swisher Mountain, a reddish-gray to reddish-brown rhyolite that forms steep canyon walls along major drainages; b) lower lobes of Juniper Mountain Rhyolite, a red, densely welded tuff that covers most of the WSA north of the Owyhee River and forms steep canyon walls along the river; c) interbedded (with Banbury Basalt) sediments of tan to greenish-tan, diatomite-bearing silt, sandy silt, tuffaceous sand, ash layers, and a basal conglomerate, all of which forms gentle slopes along the South Fork Owyhee River Canyon and the south side of the Owyhee River; and d) the Banbury Basalt, a vesicular, fine-grained, olivine basalt that throughout the area forms mesa tops and blocky ledges (Ekren and others, 1981).

3/ Derby, Gloria, 1981, Wilderness study: Boise District, Owyhee Resource Area, (Garat and "45"): unpublished U.S. Bureau of Land Management report prepared as a Wilderness Management Situation Supplemental, 7 p.

The nearest exposure of the probable basement rocks is 25 miles north of the study area, on South Mountain. There, pre-Tertiary metasediments and intrusive rocks contain deposits of gold, silver, lead, copper, and zinc.

Alluvial occurrences are restricted to relatively small gravel bars due to the steep and narrow canyons that make up the drainage system in the WSA. Two alluvial (placer) samples contained gold (fig. 2), which was valued at less than $\$0.02/yd^3$ (using a gold price of $300/oz).

MINING-RELATED ACTIVITY

Local History, Mining, and Prospecting

The Owyhee River name came from events occurring during an expedition in 1818 led by Donald McKenzie. It seems Mr. McKenzie, in the employ of the Northwest Fur Company, "upon reaching the head of what appeared to be a large river, ...sent three Hawaiin Islanders down it to investigate the area for beaver and the possibilities of navigation. The Hawaiians never returned...From this came the name 'Owyhee,' as those natives referred to their homeland," (Hanley, 1973).

Mining activity in Owyhee County began in 1862 with the discovery of placer gold on Sinker and Reynolds Creek. The following year in May placer gold was found on Jordan Creek just above what later was to be the townsite of DeLamar. Within five months, rich lode deposits of both gold and silver were discovered in the vicinity. In 1868 on South Mountain, veins of gold, silver, and lead were found. Historic value of metal production in the Owyhee Mountains (the Owyhee and South Mountain mining districts) from 1862 to 1980 totals about $92,000,000 (Wells, 1983). The South Mountain and the Owyhee districts are 25 and 45 miles north, respectively, of the WSA.

Across the border in northern Nevada, silver and gold strikes were made from 1869 to 1880 in the Bull Run Mountains, the Cornucopia district, and the Mountain City area (Granger and others, 1957).

Claims, Prospects, and Mineralized Areas

Near the southern edge of the WSA are the Lu-Lew Prospect (fig. 2) and the abandoned Kelly's Scorpion Claim. Where the Owyhee River enters the WSA on the east side is the White Point Prospect. Sections 6, 7, 18, 19, and 30, T. 14 S., R. 4 W., which are partially within the WSA, are covered by oil and gas leases and lease applications.

The nearest active mine to the study area is the Delamar silver-gold mine, about 45 miles north, in the Silver City Range. About 18 miles east-northeast of the study area, an operation had produced diatomite for filter aids, pozzolan, and insulation (Capstick and Buehler, 1985; Elevatorski, 1975). The Owyhee River and some of its tributaries have their sources in gold-silver mining districts in southern Idaho and northern Nevada, which could explain placer gold occurring in the river.

Fifty miles southeast of the 45 Ranch, the Bull Run Oil and Gas Co. in 1922 drilled an 800-ft well in the Bull Run Mountains and reported the presence of oil and gas; but in 1956 Richfield Oil Corp. drilled a nearby 3,386-ft hole, with no reported shows 4/ (Garside and Schilling, 1977). About 55 miles northeast of the study area, several dry holes have been drilled. The most recent hole completed (in 1974) is Anschutz Corporation's Federal No. 1, which reached a depth of 11,125 ft (Breckenridge, 1982; McIntyre, 1979). Federal No. 1 went through 10,950 ft of Tertiary volcanic and sedimentary rocks, and ended in Cretaceous granite (McIntyre, 1979).

Descriptions of prospects, claim areas, and mineralized areas in and adjacent to the WSA follow.

Lu-Lew Prospect

At the Lu-Lew Prospect (fig. 2), lapidary jasper occurs in the vicinity of the contact between overlying sediments and Swisher Mountain rhyolite. Several apparently isolated areas of rhyolite have been altered to and replaced by jasper and opal. Silicification appears to have been caused by ground water and was fault controlled.

Mineral specimens, mainly thunder eggs (fist-size, hollow, spherical aggregations of chalcedony), and lapidary jasper have been produced from the property. Mine workings consist of a dozer cut and shallow pit.

One random chip, three grab, and one select sample were taken. Analyses showed no metallic mineral concentrations. In one of the samples, an x-ray microprobe did detect very fine-grained monazite and grains of barite.

Small quantities of lapidary jasper, of interest to hobbyists, remain on the property. There are also a considerable number of thunder eggs scattered around the pit area.

4/ From footnote on Garside and Schilling's map: in many cases reported oil and gas shows cannot be substantiated; in other cases shows probably occurred but were not reported.

White Point Prospect

Claims for lapidary jasper are at the contact of overlying sediments with interbedded tuffs and the lower lobe of Juniper Mountain Rhyolite. About 10 acres of exposed sediments, interbedded tuffs, and rhyolite are altered to and replaced by jasper and opal. Alteration appears to have been caused by groundwater and was fault controlled. Jasper and opal from the property has been used for belt buckles, jewelry, and slabs for table tops (personal communication, Darlene Swisher, 1985).

Mine workings consist of dozer cuts and several shallow pits.

Two random chip, one grab, and three select samples were taken: no economically significant metallic or industrial minerals were present. Lapidary material is found locally on the claims.

Faulted Area

In secs. 25 and 36, T. 12 S., R. 6 W. and secs. 13 and 31, T. 12 S., R. 5 W., fault scarps were sampled in the lower lobe of the Juniper Mountain Rhyolite. The faults trend northwest and appear to be small-scale horst and graben extensional features. One grab and seven random chip samples were taken; no economically significant minerals were detected.

Diatomaceous Area

In the E1/2 of sec. 10, T. 14 S., R. 5 W., interbedded (with Banbury Basalt) sediments were examined for possible industrial minerals. A trench approximately 110 ft long was excavated into predominantly siltstone, sandy siltstone, and claystone with a cap of tuff. Some diatomite mixed with clay was identified.

APPRAISAL OF MINERAL RESOURCES

The Owyhee River Canyon WSA has no identified mineral resources. Buried, pre-Cenozoic basement rocks could be expected to be similar to those hosting precious and base metal deposits in the nearby Santa Rosa Range, Hot Springs Range, Osgood Mountains (Willden, 1964), Bull Run Mountains (Granger and others, 1957), and South Mountain (Bennett, 1976), but it is unlikely in the forseeable future that exploration will be conducted through the overlying 3,000 ft or more of Cenozoic rocks. Volcanic-hosted, low-grade precious metal deposits like the Delamar deposit are hosted by rocks older than those cropping out in the study area (Halsor, 1983). Only two of ten placer samples taken contained gold; values were less than $0.02 per cu yd. The source was probably outside the WSA.

The Lu-Lew and White Point prospects will continue to yield small quantities of lapidary jasper and mineral specimens (thunder eggs).

No industrial mineral resources were identified in the WSA. However, petrographic samples from late-Miocene lake beds, similar to those that host high-grade diatomite beds near the WSA, were found to contain diatomite. Stone and sand and gravel in the WSA are not considered resources, because such low-unit-price materials produced in bulk require a closer or more accessible market.

REFERENCES

Asher, R. R., 1968, Geology and mineral resources of a portion of the Silver City region Owyhee County, Idaho: Idaho Bureau of Mines and Geology Pamphlet 138, 106 p.

Bennett, E. H., 1976, Reconnaissance geology and geochemistry of the South Mountain-Juniper Mountain region in Owyhee County, Idaho: Idaho Bureau of Mines and Geology Pamphlet 166, 100 p.

Bonnichsen, Bill, and Breckenridge, R. M. (eds.), 1982, Cenozoic geology of Idaho: Idaho Geological Survey Bulletin 26, 725 p.

Breckenridge, R. M., 1982, Oil and gas exploration in Idaho: Idaho Bureau of Mines and Geology Map no. 4., scale 1:100,000.

Buehler, A. R., and Capstick, D. O., 1985, Mineral resources of the Little Owyhee River Wilderness Study Area, Owyhee County, Idaho: U.S. Bureau of Mines Open File Report, in preparation.

Capstick, D. O., and Buehler, A. R., 1985, Mineral resources of the Deep Creek-Owyhee River study area, Owyhee County, Idaho: U.S. Bureau of Mines Open File Report, in preparation.

Coats, R. R., 1971, Geologic map of the Owyhee quadrangle Nevada-Idaho: U.S. Geological Survey Miscellaneous Investigation Map I-665, scale 1:48,000.

Decker, R. W., 1962, Geology of the Bull Run quadrangle, Elko County, Nevada: Nevada Bureau of Mines Bulletin 60, 65 p.

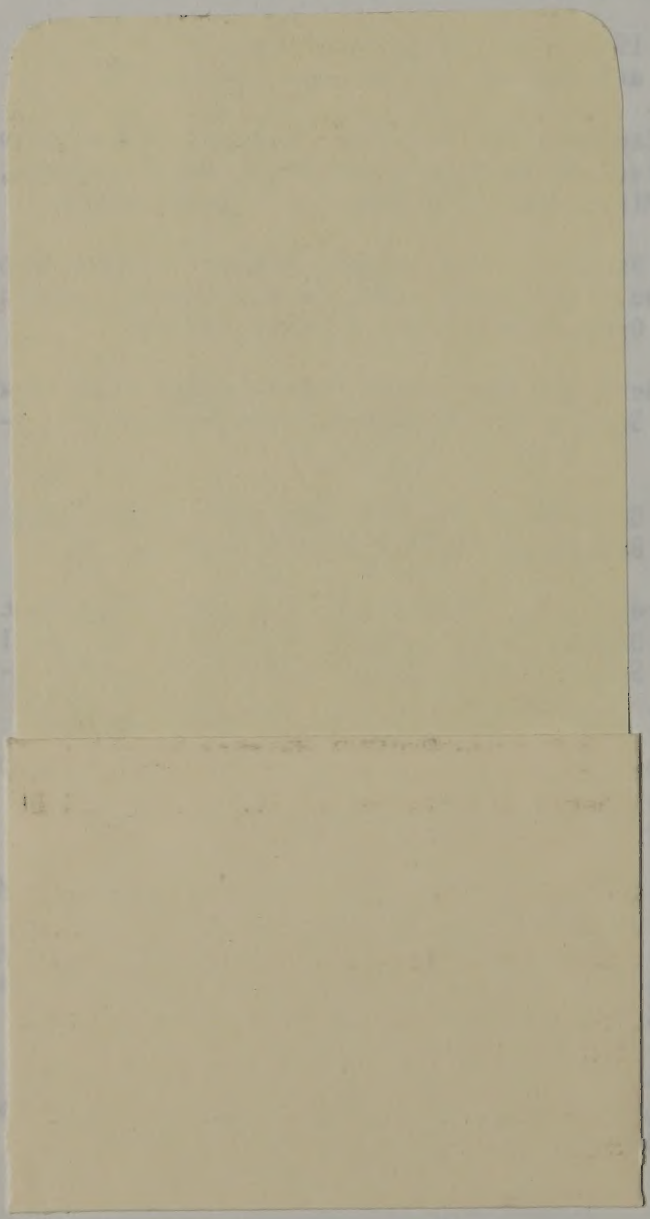
Ekren, E. B., McIntyre, D. H., Bennett, E. H., and Malde, H. E., 1981, Geologic map of Owyhee County, Idaho, west of longitude 116° W.: U.S. Geological Survey Miscellaneous Investigation Map I-1256, scale 1:125,000, 2 sheets.

_____ 1984, High-temperature, large-volume, lavalike ash-flow tuffs without calderas in southwestern Idaho: U.S. Geological Survey Professional Paper 1272, 76 p.

Elevatorski, E. A., (ed.)., 1975, Idaho industrial minerals, MINOBRAS, 49 p.

Granger, A. E., Bell, M. M., Simmons, G. C., and Lee, Florence, 1957, Geology and mineral resources of Elko County, Nevada: Nevada Bureau of Mines Bulletin 54, 190 p.

Garside. L. J., and Schilling, J. H., 1977, Wells drilled for oil and gas in Nevada through 1976: Nevada Bureau of Mines and Geology Map no. 56, scale 1:1,000,000.



Halsor, Sid, 1983, A volcanic dome complex and genetically associated hydrothermal system, Delamar silver mine, Owyhee County, Idaho: Master Thesis, Michigan Technological University, 111 p.

Hanley, Mike, 1973, Owyhee trails--the west's forgotten corner: Caxton Printers, Ltd., 314 p.

Kittleman, L. R., 1973, Guide to the geology of the Owyhee region of Oregon: Museum of Natural History, University of Oregon Bulletin 21, 61 p.

Linne, J. M., 1985, Mineral resources of the Owyhee Canyon Wilderness Study Area, Malheur County, Oregon: U.S. Bureau of Mines Open File Report, in preparation.

Mathews, G. W., and Blackburn, W. H., 1983, Assessment of geology, energy, and mineral (GEM) resources, Owyhee River GRA (ID-010-11), Owyhee County, Idaho: prepared under U.S. Bureau of Land Management contract YA-553-CT21042 by TERRADATA, Lakewood, Colorado.

Mayerle, R. T., 1985, Mineral resources of the South Fork Owyhee River study area, Owyhee County, Idaho, and Elko County, Nevada: U.S. Bureau of Mines Open File Report, in preparation.

McIntyre, D. H., 1979, Preliminary description of Anschutz Federal No. 1 drill hole, Owyhee County, Idaho: U.S. Geological Survey Open-File Report OFR 79-651, 15 p.

Taubeneck, W. H., 1971, Idaho batholith and its southern extension: Geological Society of America Bulletin, v. 82, no. 7, p. 1899-1928.

Thornbury, W. D., 1965, Regional geomorphology of the United States: John Wiley and Sons, Inc., 609 p.

United States Department of Commerce Publication, 1973, Climatography of the United States No. 81, monthly normals of temperature, precipitation, and heating and cooling degree days 1941-70: National Oceanic and Atmospheric Administration, Environmental Data Service, National Climatic Center, Ashville, N.C.

Warner, M. M., 1980, Southern Idaho, northern Nevada, southeastern Oregon - a prime target for petroleum exploration, 1980, Wyoming Geological Association Earth Science Bulletin, v. 13, no. 1, p. 19-40.

Wells, M. W., 1983, Gold camps and silver cities: Idaho Bureau of Mines and Geology Bulletin 22, 165 p.

Willden, Ronald, 1964, Geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 154 p.